

THE APPLICATION OF RENEWABLE ENERGY OPTIONS TO OFF-SET CLIMATE CHANGE AND SUSTAINABILITY CHALLENGES IN THE CARIBBEAN

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Challenges of Climate Science and Renewable Energy**

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Organización Latinoamericana de Energía
Latin American Energy Organization
Organisation Latino-américaine d'Énergie
Organização Latino-Americana de Energia

Vision

OLADE is a political and technical-support organization through which its Member States undertake common efforts to achieve regional and sub-regional energy integration.

Mission

To contribute to the integration, sustainable development and energy security in the region, advising and promoting cooperation and coordination among its Member Countries.

Climate Change & Sustainability Challenges

Global population will rise from 7 bn to > 9 bn by ~ 2050 .
Causes: continuing rise in world average life expectancy, relatively high fertility levels in developing countries.

As countries develop, consumption patterns change. For example, consumption of meat in China has risen since 1985 from 20 \rightarrow 50 kg/c/a (requires additional ~ 300 m T of grain).

Conclusion: we will have to provide food, fibre, clothing, housing, energy, water, metals, minerals etc. for ~ 2 bn more people, at significantly higher *per capita* consumption levels.

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WORLD POPULATION PROSPECTS

Population in thousands of millions. Total > 9 bn



— * Includes Africa, Asia (not Japan), Latin America and Caribbean

— * Includes Australia, New Zealand, North America, Europe and Japan

SOURCE: UN Department of Economic and Social Affairs

Climate Change & Sustainability Challenges

Economic Transformation

Since 1985, China's GDP ↑ 16-fold, share of global manufacturing ↑ from 2.9 % to 20 %, moved from 10th largest economy to 2nd, could be 1st in the 2020s.

Growth rates in BRIC nations are overtaken by 'N-10' group (Bangladesh, Indonesia, Iran, Mexico, Nigeria, Pakistan, the Philippines, South Korea, Turkey and Vietnam) and 'CIVETS' group (Colombia, Indonesia, Vietnam, Egypt, Turkey, and South Africa).

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Climate Change & Sustainability Challenges

Economic Transformation

Of the 10 fastest-growing economies between 2000 and 2013, 7 were African.

By 2030 about 50 % world GDP will be generated in countries recently/still classed as developing.

Probably the most rapid & extensive shift in world economic power in history.



Climate Change & Sustainability Challenges

Soaring energy demand

- IEA projects that world energy consumption will grow by ~ 50 % by 2030, from 495 to 739 QBTU, with DN creating ~ 75 % of the increased demand.
- If this is based on hydrocarbons, demand for oil will increase by ~ 40 % and coal by ~ 75 % over the period.



Climate Change & Sustainability Challenges

Soaring energy demand

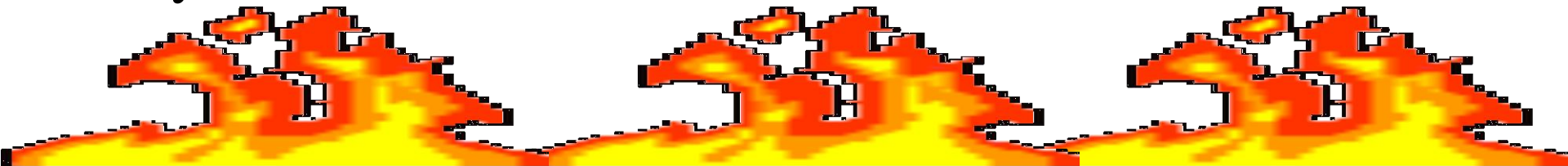
It will be very difficult to meet CO₂ reduction targets, reduce risk of climate change and meet need for energy security without LARGE improvements in energy efficiency and productivity.





World Bank warns of 4 degree threshold

- Temperature has risen by almost 1 C.
- Increase of 3 - 3.5 C by 2100 'probable'.
- Predicts 'catastrophic consequences' if 4 C rise.
- Sea level 1 m higher, droughts, extreme heat waves 9 C hotter than today. Southern Europe could resemble Libyan desert.





What are the Implications?

- ~ 99 % of global impact will affect mainland states – but island nations typically have much less resilience; some may become non-viable.
- Centres of population and agricultural production may migrate to temperate zones.
- Projected increase in population & changes in diet require doubling agricultural production by 2050.



What are the Implications?

- Replacing fossil hydrocarbons with biofuels will increase pressure on available land.
- Combination of climate change and increased demand may lead to critical water shortages in ~ 50 countries.
- Likely to be rapid losses among the remaining biodiversity unless agricultural production is made more efficient and intensive, so that greater volumes of output can be generated on smaller areas.



What are the Implications?

“World demand for food, water, and energy will grow by approximately 35, 40, and 50 % respectively by 2030, due to the increase in the global population and increased consumption, and that climate change will create instability in many regions e.g. by contributing to water and food shortages”.

Source: US National Intelligence Council - 2013

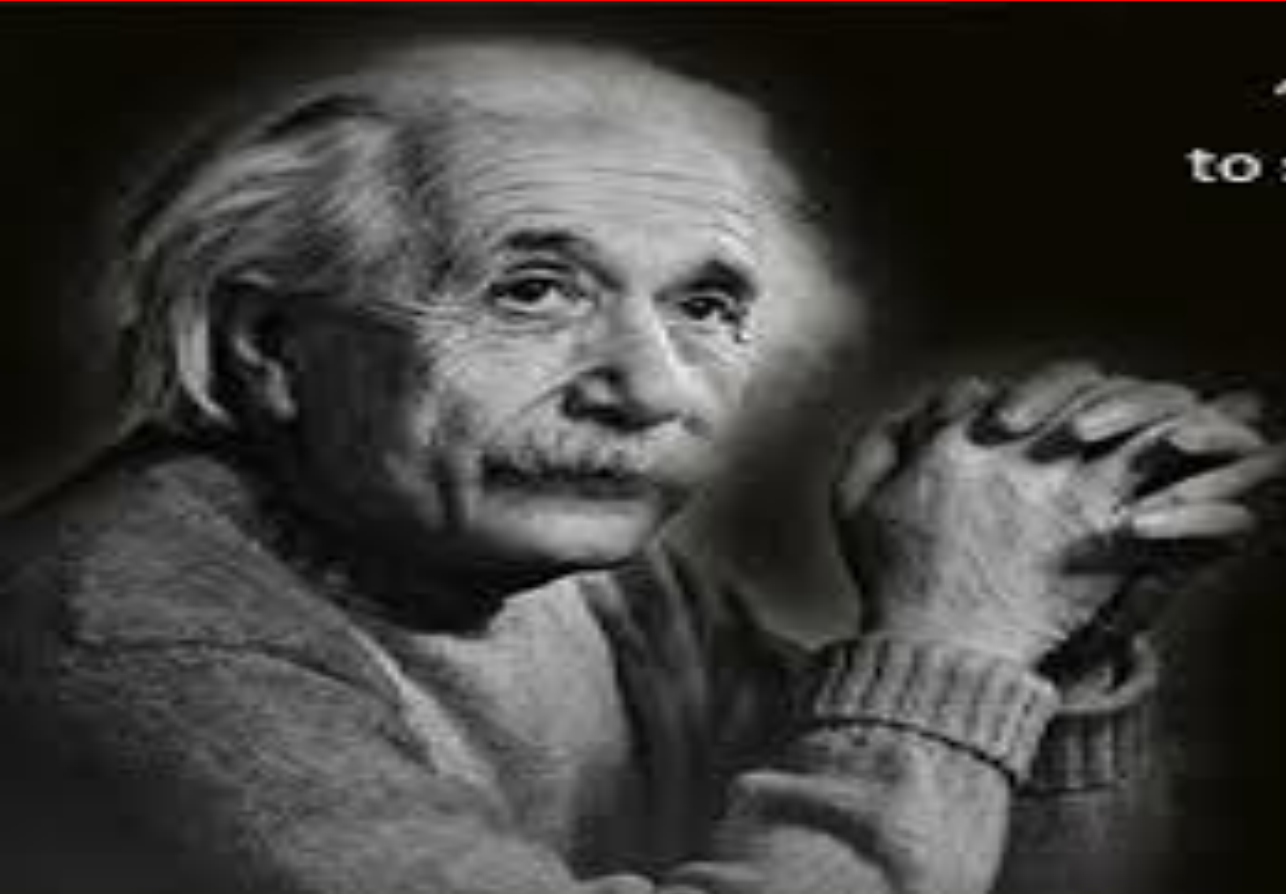


Are there solutions?

- Failure to resolve these issues could result in conflicts to control resources; ~70 countries have combination of high risk factors (resource scarcity, population growth, predominantly young population).
- We have to find the solutions for a number of problems simultaneously: strengthening economic growth, meeting energy & resource needs, mitigating climate change, increasing food and water security.



Are there solutions?



"If I had an hour
to solve a problem
I'd spend
55 minutes
thinking about
the problem
and 5 minutes
thinking about
solutions."

— Albert Einstein

Climate Change & Sustainability Challenges

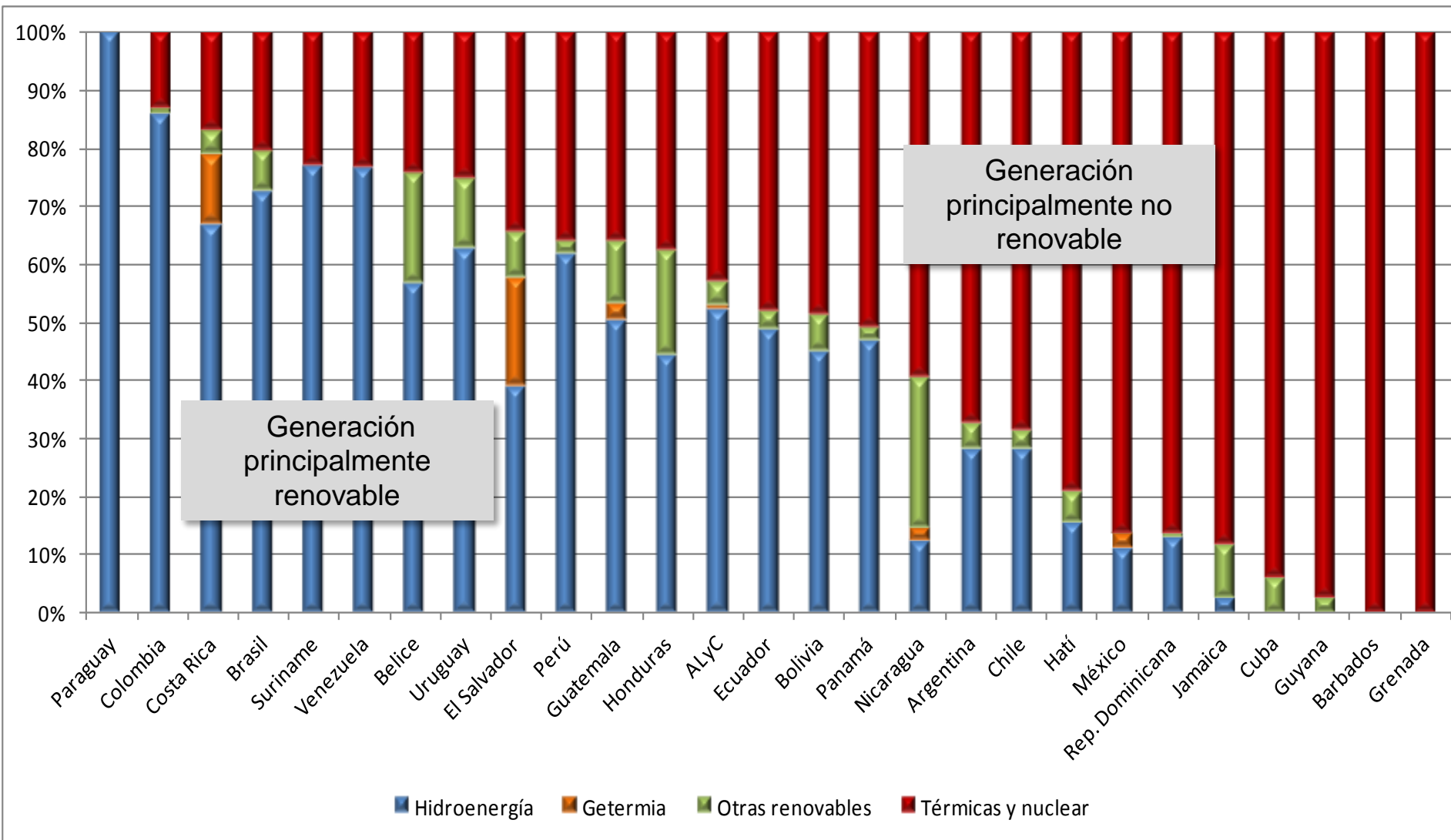
Solutions Options

*The solutions to our problems lie in Policy Shifts,
Resource Management, Innovation, & Application.*

Application of Renewable Energy Options

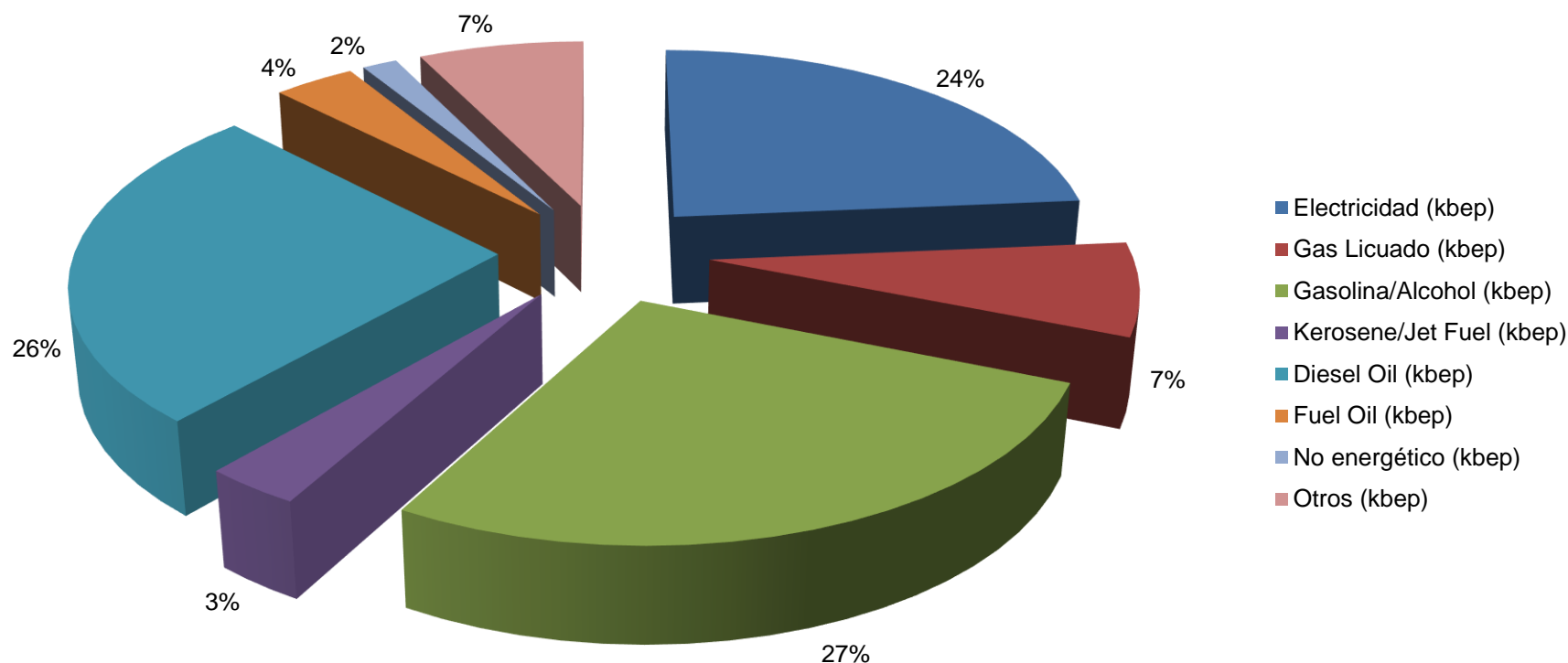
Composición de la Matriz Energética en América Latina y El Caribe

Estructura de generación de electricidad por fuente

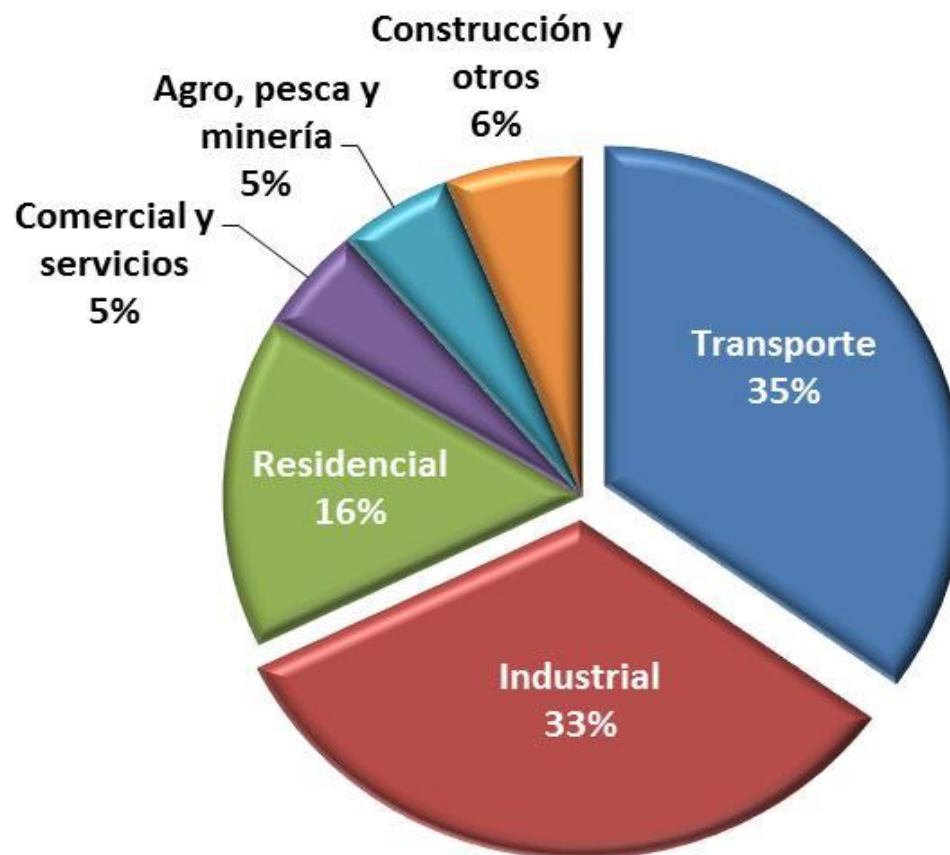


Consumo final de energía secundaria AL&C 2013

Consumo Final - 2013 - América Latina y el Caribe Energía Secundaria



Estructura sectorial del consumo final de energía



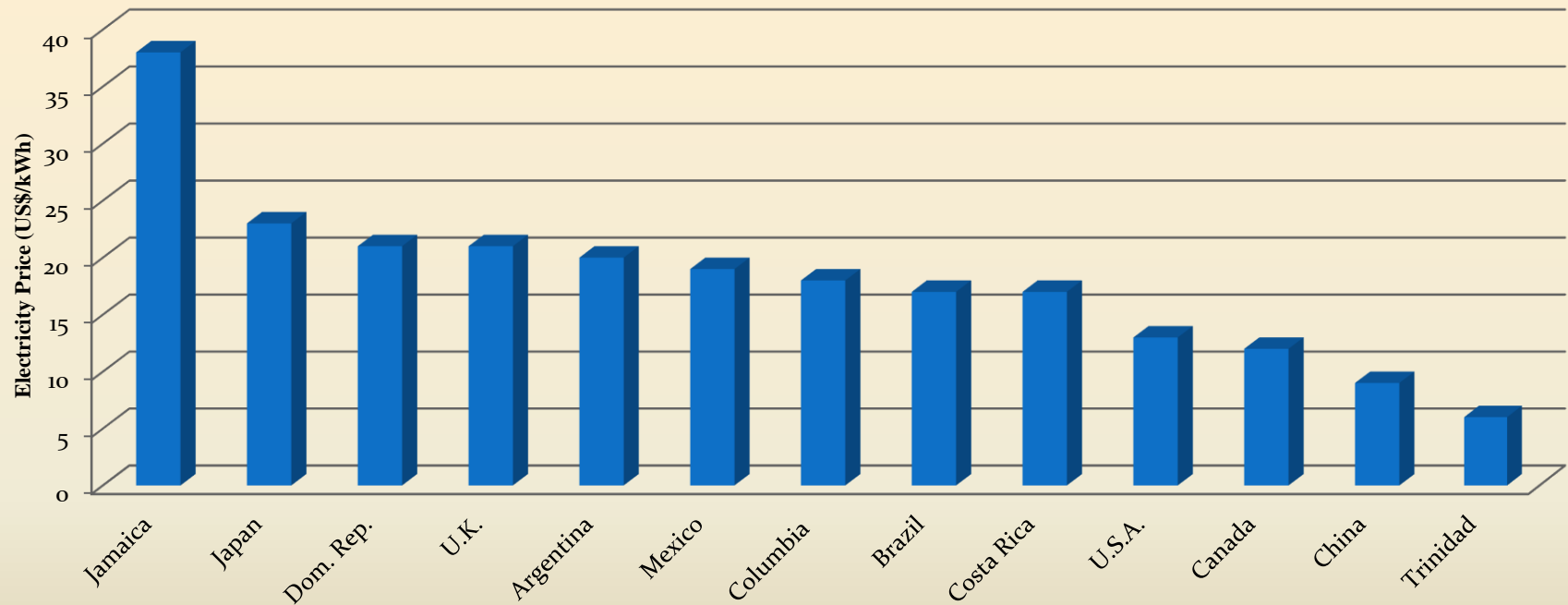
Fuente: SIEE-OLADE, 2013, datos del año 2011

Application of Renewable Energy Options

Alternativas para una Energía Sostenible en AL&C

Application of Renewable Energy Options

Electricity Prices - Residential Consumers

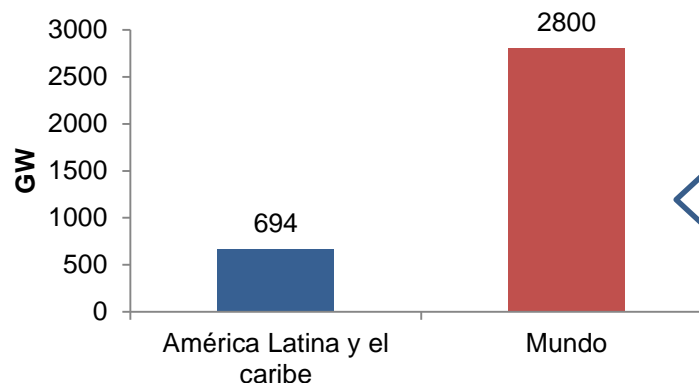
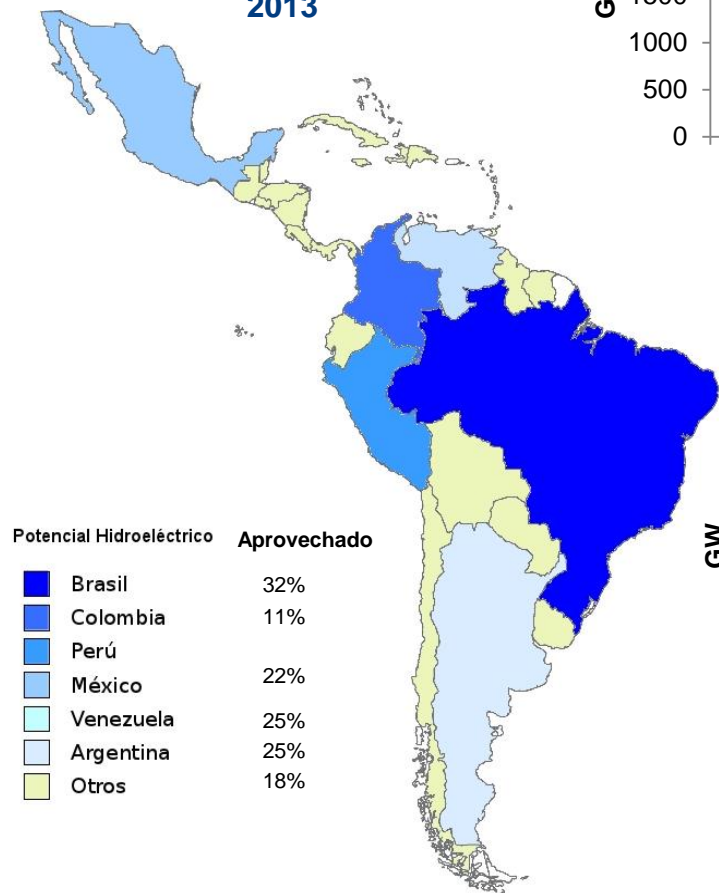


Las Oportunidades para la Energía Sostenible en América Latina y El Caribe es diversa



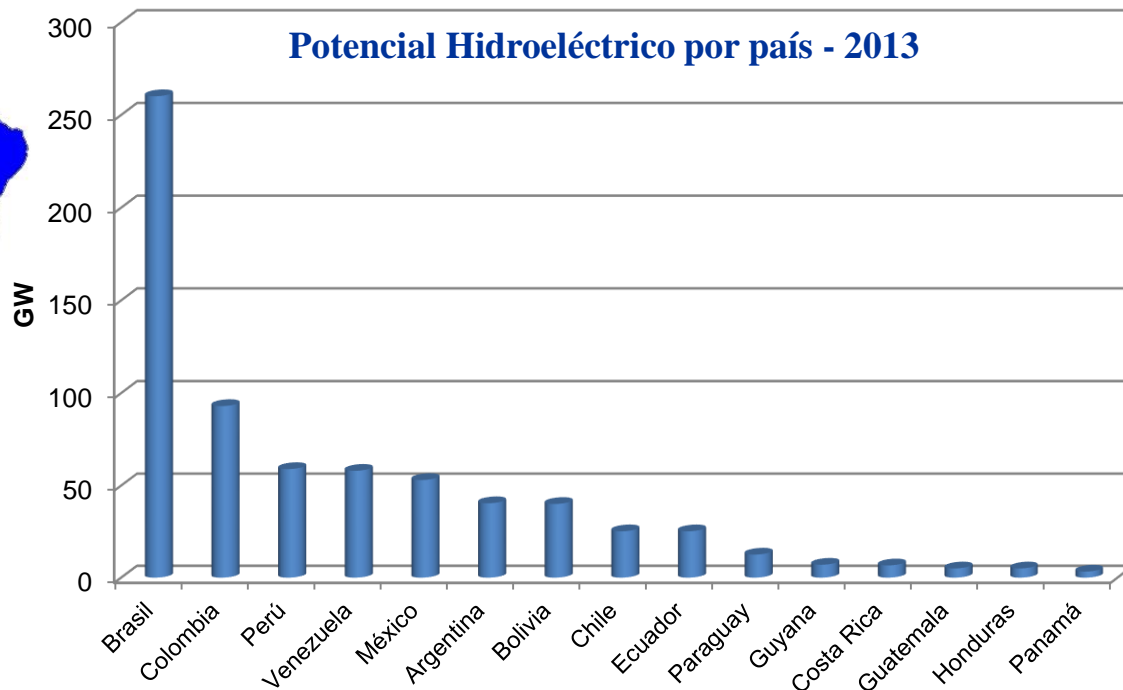
DISPONIBILIDAD DE RECURSOS ENERGÉTICOS

Potencial hidroeléctrico aprovechado 2013



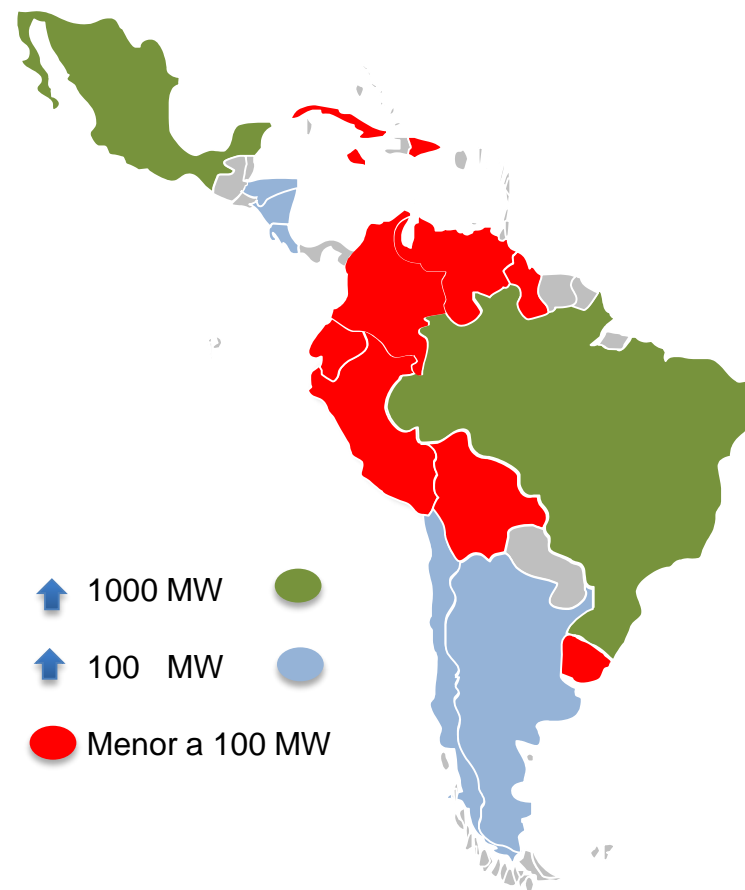
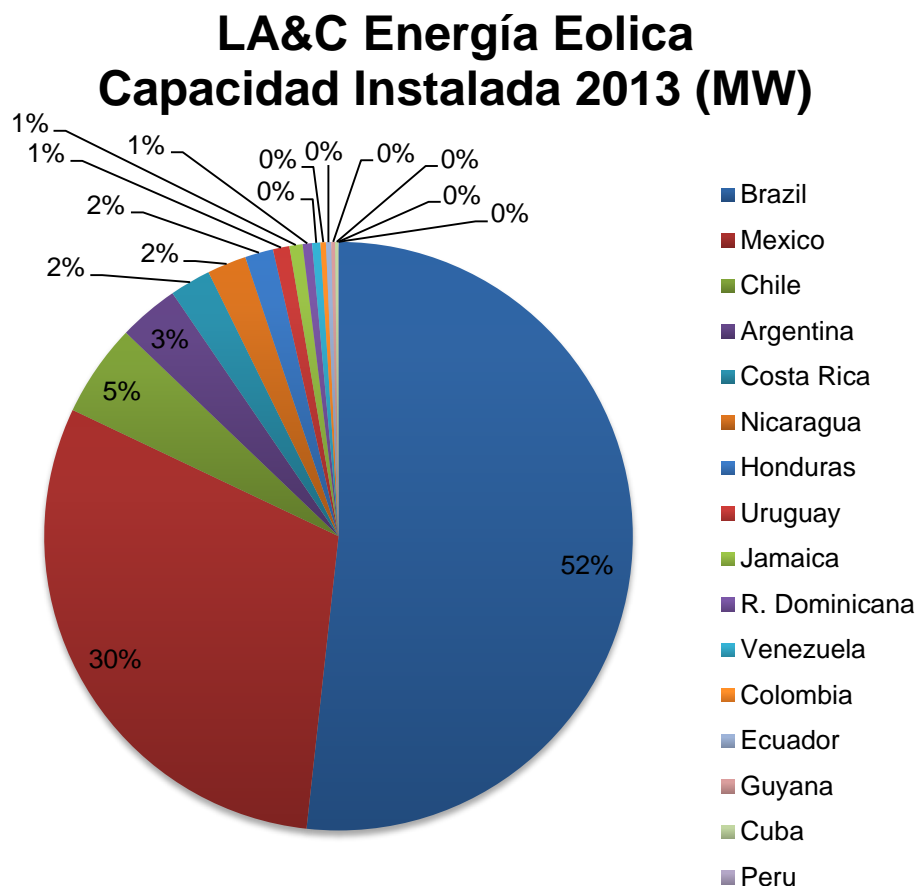
AL&C cuenta con el 25% de potencial hidroeléctrico mundial y de este valor solo aprovecha el 23%

Potencial Hidroeléctrico por país - 2013



DISPONIBILIDAD DE RECURSOS ENERGÉTICOS

Capacidad Instalada Eólica 2013



Fuente: WWEA, Half year Report 2014

Cap. Instalada LA&C 2013: 6,570 MW
Potencial LA&C: 557,884
Aprovechado: 1.2%


DISPONIBILIDAD DE RECURSOS ENERGÉTICOS

Potencial y Capacidad Instalada Geotérmica

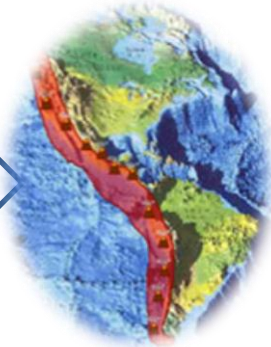
	Potencial (MW)	Capacidad instalad (MW)	% aprovechado
Argentina	2,010	0	0%
Bolivia	2,490	0	0%
Brasil	115	0	0%
Chile	3,350	0	0%
Colombia	2,210	0	0%
Costa Rica	2,900	217	7.5%
Ecuador	1,700	0	0%
El Salvador	2,210	204	9.2%
Grenada	1,110		0%
Guatemala	3,320	32	1.0%
Honduras	990		0%
Jamaica	100		0%
México	40,000	958	2.4%
Nicaragua	3,340	165	4.9%
Panamá	450	0	0%
Perú	2,990	0	0%
Venezuela	910	0	0%
ALyC	70,195	1,576	2.2%

* Datos actualizados al 2012

Cap. Instalada LA&C 2013: 1,576 MW
Potencial LA&C: 70,195
Aprovechado: 2.2%



La ubicación de varios países en el Cinturón de Fuego del Pacífico, determina que la geotermia sea un recurso energético renovable de considerable importancia en la Región, aunque muy poco aprovechado



LOOKING FORWARD

1. The region has excellent renewable energy potential, especially for solar and wind energy. Solar irradiance is relatively consistent throughout the year and strong wind energy potential exists in many areas, feasible even at low season.
2. Distributed solar PV generation at all levels can play an important role in the region's energy mix.
3. Opportunities exist for small hydropower options.
4. Conservative estimates suggest that biomass, waste to energy, etc; can provide cheap power to regional power generation profile, perhaps as high as 5 %.

BARRIERS INHIBITING GROWTH OF INDUSTRY

- a. Technical Capabilities** – Ability to identify, develop, implement and sustain a cost effective RE & EE programme with participation from key and influential stakeholders.
- b. Credit Worthiness** - The ability to raise or arrange project based financing from local commercial banks in a structured and efficient manner.
- c. Regulatory Aspect** – An enabling legal framework that would recognize clearly the status and specificities of an energy performance contract, supported by a justice system that can efficiently enforce contractual agreements

BARRIERS INHIBITING GROWTH OF INDUSTRY

d. Standards Specifications – The presence of a neutral third party institution that certifies RE/EE products and/or services as an important commercial imperative.

e. Strategic Market Focus – Definition and presentation of a market. The public sector is normally given up to the market.

f. Structural and Political Barriers - Unnecessary/inappropriate Government intervention, incoherent and unpredictable policies/policy reversals, tariffs, etc.

CONCLUSIONS

- a. The RE & EE/EC industry requires representation from a single and potent entity that acts as the information clearing house.
- b. Governments should offer up the public sectors for RE & EE project initiatives by the private sector.
- c. Focused attention must be spent on the procurement aspects for RE & EE initiatives in the sector, particularly if Government is involved.
- d. A Special Needs Financial Instrument should be introduced to facilitate investment and development opportunities, and to collateralize a financial support system for the sector.

CONCLUSIONS

e. Strategic Market Focus – The development and actualization of a comprehensive programme to better open the RE & EE industry to investors.

f. Capacity Building – Raising the competency standards of service providers to certification levels.

g. Structural & Political Barriers – Management of tolling agreement with utility companies and operators; eg. Feed-in tariffs.

h. Dispute Settlement – The creation of a facility to swiftly and effectively deal with contract disputes within the respective sectors.

CONCLUSIONS

- i. EPC Market Drivers** – Influential factors determining the EPC market.
- j. Financing Protocol** – Structured and acceptable means of building confidence in EPC procurement and financing.
- k. Monitoring and Verification** – General performance assessment of services delivered.

CAPACITY BUILDING INITIATIVES

#	Course	Hours	Mode
1	Management of Wind and Solar Projects	10	Online
2	Economic Analysis of Renewable and Non Renewable Energy.	10	Online
3	Technical, economic and environmental management of biofuels	10	Online
4	Technical, economic and environmental management of biofuels	10	Online
5	Diploma/certificate Energy Development & Social Inclusion	6/7 wks	F 2 F



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THANK YOU

Nos une la energía · Energy unites us · L'énergie nous rassemble · A energia nos une